REMARKS

Reconsideration of the above-identified patent application is respectfully requested.

Claims 1-12 are pending in this application, of which claims 3 and 4 have been previously withdrawn from consideration. Claims 1, 2, and 5-12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Journal of Planar Chromatography, Vol. 11, July/August 1998, pages 244-246 by Nurok ("Nurok") in view of U.S. Patent Serial No. 3,864,250 to Perry ("Perry"). Claims 11 and 12 also stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nurok in view of Perry in further view of U.S. Patent Serial No. 4,671,870 to Tompa ("Tompa"). Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Nurok in view of Perry in further view of U.S. Patent Serial No. 5,248,426 to Stillian ("Stillian").

§103(a) Rejections - Nurok and Perry

The Examiner rejected claims 1, 2, and 5-12 as being unpatentable over Nurok in view of Perry. Nurok discloses details of a planar electrochromatography experiment in which a mixture of dyes are separated using electroosmotic flow. As referenced in Nurok, electrochromatography is disclosed in detail in the journal article entitled "Electro-osmosis: A New Concept for High-Speed Liquid Chromatography" by Pretorius et al (Journal of Chromatography, Vol. 99, 1974, 23-30) ("Pretorius), which was cited in the Information Disclosure Statement filed May 24, 2005. Pretorius discusses at length the advantages of electrochromatography over typical planar chromatography. For example, Pretorius discloses that solvents or eluents are separated in electrochromatography by electroosmotic flow rather than by capillary flow and/or pressure driven flow as is the case in typical planar chromatography. Nurok summarizes some of the advantages of electroosmotic flow:

> "The [Pretorius] report described a separation of four steroids in 4 min using a field of 2000 V cm-1, compared with 60 min for the same separation by conventional (capillary flow) planar chromatography. **The authors noted that in addition to the speed of the process, the technique had two other advantages over capillary or pressure driven flow- a flatter flow profile and a flow rate independent of particle size.**" (Nurok, page 244, Col. 1, 1st paragraph, emphasis added).

Unlike capillary flow and/or pressure-driven flow, which have laminar flow profiles, electroosmotic flow has a substantially flat flow profile typically referred to as a "plug flow"

profile. As discussed by Prctorius and summarized by Nurok, electroosmotic/plug flow has several advantages over capillary/laminar flow in chromatography applications. One such advantage is that plug flow has an increased separation efficiency compared to laminar flow due to a reduction in transaxial zone broadening.

Conversely, Perry is directed to improving typical thin layer chromatography, which uses capillary action to separate the eluents or solvents: "The speed, range, efficiency and resolution of liquid solid adsorption chromatography, especially thin layer chromatography, are improved by use of heat." (Abstract). To do so, Perry teaches an apparatus and method for improving or maintaining capillary flow:

> "The temperature of the plate is preferably maximized up to a level slightly above or near the boiling point of the solvent **to prevent excessive loss of solvent from the plate by evaporation, which would in turn prevent the solvent from advancing by normal capillary action.**" (Col. 2, ll. 44-48, emphasis added).
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> "After the edge of the plate has been immersed in the solvent, **the solvent advances upward in the thin adsorbent layer by capillary forces.**" (Col. 3, ll. 20-23, emphasis added).
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> "The free edge 46 of the barrier adjacent the porous surface of the plate 42 is slightly spaced from said surface to prevent damage to the plate and **to prevent interference with normal capillary flow through the bed.**" (Col. 5, ll. 5-9, emphasis added).
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> "The remainder of the plate is simply heated until the rate of evaporation therefrom exceeds **the rate at which new solvent enters the adsorbent by capillary forces.**" (Col. 6, ll. 52-55).
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> "Reconcentration is accomplished by evaporating solvent from the solvent front at a rate which is slightly faster than **the rate at which the front is advancing by normal capillary forces.**" (Col. 8, ll. 8-11, emphasis added).
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> "By adjusting the rate of solvent evaporation from the adsorbent bed, as herein described, it becomes possible **to cause the solvent front to remain stationary against continued capillary flow**" (Col. 8, ll. 21-24, emphasis added).
>
> "In the previous embodiments, the upper permissible temperature was limited substantially to the boiling point of the solvent at atmospheric pressure, or that point at which the solvent would **leave the bed by**

> **evaporation faster than it would enter by capillary action.**" (Col. 8, ll. 53-57, emphasis added).
>
> "In the present invention, uniform pressure is employed to maintain the solvent in a liquid form and **allow progression of solvent through the bed by normal capillary forces.**" (Col. 9, ll. 8-11, emphasis added).
>
> "Since the pressure at both ends of the tube is substantially equal, there is no pressure differential and **the solvent or mobile phase flows through the bed solely by capillary forces.**" (Col. 10, ll. 19-22, emphasis added).

Turning now to the specific rejections of independent claims 1, 8, 10, and 11, the Examiner rejected these claims based on the combination of Nurok and Perry. The Examiner argues that Nurok discloses the elements of these claims except for reciting the use of pressure and temperature control. The Examiner relies on Perry to overcome these deficiencies of Nurok. In an attempt to establish a case of obviousness based on Nurok and Perry, the Examiner contends that:

> "At best, the claims differ from Nurok (Journal of Planar Chromatography, Vol. 11, July/August 1998, pages 244-246) in reciting use of pressure. Perry (U.S. Patent No. 3,864,250) (column 1, lines 45-51) discloses that heat controls the movement of solvent through the bed and pressure may be used to control evaporation. **It would have been obvious to use a temperature controlled pressure chamber in Nurok (Journal of Planar Chromatography, Vol. 11, July/August 1998, pages 244-246) because Perry (U.S. Patent No. 38,864,250) (column 1, lines 45-51) discloses that heat controls the movement of solvent through the bed and pressure may be used to control evaporation.**" (Office Action dated 6/22/2005, page 2, second paragraph, emphasis added).

Applicants strongly disagree. As described above, Nurok teaches the use of electrochromatography and the advantages of electroosmotic flow over capillary flow whereas Perry teaches the use of capillary flow in typical chromatography. As such, Nurok and Perry teach away from each other and the exact combination proposed by the Examiner. **Once one has already achieved the advantages of electroosmotic/plug flow and overcome the disadvantages of capillary/laminar flow, one would not look back to methodologies for**

improving capillary/laminar flow because the disadvantages of capillary/laminar flow have already been overcome. By way of analogy, one interested in improving fuel injection performance for a vehicle would not be motivated to look back to methodologies for improving carburetor performance because one has already overcome the disadvantages associated with carburetor designs.

Further, one would not expect that a feature or method used for improving the effects of capillary/laminar flow would even be usable with systems using electroosmotic/plug flow due to the vast differences between the flow types. Returning to the fuel injector analogy, one interested in improving fuel injection performance would not be motivated to look to methodologies for improving carburetor performance because these two fuel delivery methods are so vastly different that one would not expect carburetor improvement methods to even be useable with fuel injection systems.

In light of the above, one would not have a reasonable expectation of success to use methods and/or apparatuses taught in Perry with the methods and/or apparatus taught in Nurok because (i) the disadvantages of capillary/laminar flow have already been overcome with the advantages of electroosmotic/laminar flow and (ii) capillary/laminar flow is so different from electroosmotic/plug flow that one would not expect methods for improving capillary/laminar flow to be usable with electroosmotic/plug flow. As such, one of ordinary skill in the art would not be motivated to combine the teachings of Nurok with the teachings of Perry. Accordingly, for at least the reasons provided above, the combination of Nurok and Perry can not be said to render claims 1, 8, 10, and 11 obvious.

§103(a) Rejections - Nurok, Perry, and Tompa

The Examiner also rejected claims 11 and 12 as being unpatentable over Nurok in view of Perry and in further view of Tompa. As such, all the arguments provided above in regard to the combination of Nurok and Perry apply with equal force to the combination of Nurok, Perry, and Tompa. Further, Tompa teaches an invention that "relates to an apparatus for overpressured thin-layer chromatographic techniques." (Abstract). Overpressured thin-layer chromatography (OTLC) uses pressure to propagate the solvent or eluent:

> "The overpressure makes the eluant flow over channels 22 on the sorbent layer 2 wherein the eluant can move in these channels, as

> shown by arrows in FIGS. 7 and 8, in the direction of the edge 18 of the carrier plate 3. During this movement the separation of the sample takes place into components." (Col. 7, ll. 34-40).

Similar to capillary flow, pressure driven flow has a laminar flow profile. As such, Tompa teaches the use of laminar flow in chromatography. As discussed in detail above, Nurok teaches the use of electrochromatography and the advantages of electroosmotic/plug flow derived therefrom over pressure driven/laminar flow. Accordingly, Nurok and Tompa teach away from each other. One who has already achieved the advantages of electroosmotic/plug flow and overcome the disadvantages of pressure driven/laminar flow would not be motivated to look back to methodologies for improving pressure driven/laminar flow because the disadvantages associated with pressure driven/laminar flow have already been overcome. Additionally, one would not expect methods or devices for improving pressure driven/laminar flow to even work or otherwise be applicable to electroosmotic/plug flow because these two types of flow are different from each other. For at least these reasons, one of ordinary skill in the art would not be motivated to combine the teachings of Nurok with the teachings of Perry and/or the teachings of Tompa. Accordingly, the combination of Nurok, Perry, and/or Tompa can not be said to render claim 11 obvious.

For at least the reasons provided above, Applicants believe that claims 1, 8, 10, and 11 are in condition for allowance. Because claims 2 and 5-7 depend from claim 1, claim 9 depends form claim 8, and claim 12 depends from claim 11, these claims are also believed to be in condition for allowance. Accordingly, claims 1, 2, 5-12 are believed to be in condition for allowance, and such action is respectfully requested.

It is respectfully requested that, if necessary to effect a timely response, this paper be considered as a Petition for an Extension of Time sufficient to effect a timely response and shortages in other fees be charged, or any overpayment in fees be credited, to the Account of

Barnes & Thornburg LLP, Deposit Account No. 10-0435 with reference to file 29920-73303.

Respectfully submitted

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